The Excavating Engineer

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The Detroit Sewage Program — III

The Bedford Avenue System

NOTE: — *This is the third of a series of articles that will appear in The Excavating Engineer concerning Detroit's Sewage Program. The story of this work should prove to be of interest to our readers for two reasons: first, because it is the largest sewer in the world; secondly, because the work is done almost entirely by dragline excavators.*

THE third of the four main sewer systems under construction in Detroit is the Bedford Avenue System, which begins at Fox Creek and runs north on Bedford Avenue a distance of 10,900 feet. Although this system is smaller than the Conners Creek and Ashland Avenue Systems, it is a notable piece of work.

This system, like those mentioned above, and described in previous issues of *The Excavating Engineer,* is divided into two sections, Sections No. 1 and 2, the contract for the first section having been awarded to the T. A. Gillespie Contracting Company of Detroit and New York. The contract for the second section went to Albert Tobin of Detroit. It will be remembered that T. A. Gillespie Contracting Co. were the successful bidders on the Conners Creek System, the largest of the four main sewers. Albert Tobin, it may be recalled, was the successful bidder on the second section of the Ashland Avenue System.

Bucyrus 20-B Dragline Owned by Davis & Bentley in Operation on Albert Tobin's Contract, Second Section, Bedford Avenue System

Section 1

The contract for Section 1 of the Bedford Avenue System, which consisted of 55,000 feet, was awarded to T. A. Gillespie Contracting Co. at the cost of $30.00 per lineal foot. This contract called for one-barrel concrete sewer, 8 feet 9 inches internal diameter with 12-inch walls. The contract did not call for reinforcement.

The excavation on the first section was done by a Brownhoist crane of the larger type with a dragline bucket. The material consisted for the most part of a heavy earth, with a stratum of about two feet of blue clay at the bottom of the cut.

The machine took a cut 16½ feet deep and 15 feet wide at the top, with a slope of approximately one to one. The total excavation amounted to about 400,000 cubic yards of material.

The concreting was handled by a portable Lakewood steam mixer, and Blaw-Knox collapsible forms were used. Three manholes were equally spaced at intervals of about 1850 feet.

The surplus material from the backfill was used in reclaiming the land in the vicinity of the systems, the backfilling having been done by a ¾-yard small revolving shovel.

Section 2

The contract for Section 2 of the Bedford Avenue System was awarded to Albert Tobin at a cost of $28.00 per lineal foot. The contract called for the same type of sewer as that of Section 1, and amounted to about 5,400 feet.

Bucyrus Class-14 Owned by Albert Tobin in Operation on the Conners Creek System

The excavation was handled by a McMyler dragline and a Bucyrus 20-B dragline, both ¾-yard machines. The material handled was somewhat similar to that of Section 1, except that the stratum of blue clay which was encountered in Section 1 approached a point nearer the surface, and consequently made digging somewhat more difficult.

Another View of the Bucyrus 20-B Dragline Owned by Davis & Bentley on Albert Tobin's Contract, Bedford Avenue System

The concreting was done in a similar manner to that of Section 1. It is interesting to note, however, that the Ransome 1-yard portable mixer owned by Albert Tobin served with his Ashland Avenue and his Bedford Avenue contracts at the same time. Manholes were placed every 1000 feet. Two were placed in the seven-foot Bedford Avenue tributaries at Warren Avenue. 1.3 cubic yards of concrete were used per lineal foot. Ransome forms, both the invert and the arch, were used. Every effort was made to maintain an average of 75 feet a day on the work.

The Bedford Avenue System is so designed that with a slope of .05 to 100 feet the center line at the mouth of the sewer is at a level with Fox Creek into which it dumps.

Large Order Placed by Oliver Iron Mining Company

The largest single order for excavating equipment ever known to be given to one concern was awarded to the Bucyrus Company by the Oliver Iron Mining Company, Hibbing, Minnesota, recently, all of which is to be used on the Mesabi Range. The list includes one Bucyrus 80-B caterpillar-mounted, revolving-type shovel, three Bucyrus 50-B caterpillar-mounted, revolving-type shovels, one Class-50 spreader plow, and seventeen sets of caterpillars for 100-Ton shovels.

The Greatest Garnet Quarry in the World

Description of the Plant of the North River Garnet Company in Warren County, New York, Where a Steam Shovel Is Used for Handling the Ore

TO most of us the idea of mining garnet with a steam shovel is nearly as incongruous as B. V. D.'s and straw hats in the Arctic. The garnet naturally, to our minds, is a semi-precious stone such as is used as a colorful adornment for the fair sex and other decorative individuals. Strange as it may seem, however, this use of the garnet is the least valuable and important to which it is put.

The mill, looking west towards Thirteenth Lake. Situated on the side of the hill, the material is fed by gravity from one department to the other.

Garnets are mined in this country for less esthetic and more practical purposes, such as for manufacturing abrasive coatings for certain kinds of sandpapers and cloths and for the finishing processes in the production of plate glass.

In the August, 1923 issue of the *Compressed Air Magazine*, Robert G. Skerrett tells in detail how abrasive garnet is mined in what is probably the foremost mine of its kind in the world; how it is separated from the enveloping rock by milling methods and prepared for the market. It is not our purpose here to go into the detail in the description of this process, which has been brought to such a notable degree of effectiveness by Mr. Frank C. Hooper of the North River Garnet Company. We will confine ourselves herein mainly to those features of this unsual mine which pertain more directly to the subject of excavation.

The Company and Its History

The plan and associated properties of the North River Garnet Company, the largest producer of abrasive garnet in the United States, is tucked away in the heart of the Adirondack Mountains near the beautiful Thirteenth Lake, about 3½ miles to the south and west of the village of North River, Warren County, New York. Mr. Frank C. Hooper, manager and part owner of the company and one of the pioneers in the industry, established an experimental mill not far from here in 1893 and a year later organized his first commercial plant in a part of Essex County which is now embraced by Hamilton County, New York. For two decades this was the only garnet concentrating plant in the world. Since 1905 the present operations have continued without a break under his supervision.

The Product

As Mr. Skerrett says, the deposit is a fairly extensive one well up on the mountainside, and the ore, to quote the geologist, "is a garnetiferous gneiss containing almandite garnet in grains from a small fraction of an inch to four or five inches in diameter," though pockets or crystals weighing 75 pounds are found at times. The average garnet content of the rock is probably between 8 per cent and 10 per cent, which means that a large quantity of raw material must be handled in order to yield a single ton of marketable abrasive. But this apparent handicap is more than offset by the excellence of the product.

According to the United States Bureau of Mines, well nigh all types of garnet may be used for gemstones when found sufficiently clear and transparent, but only the almandite variety has been proved by actual use to be a high-grade abrasive. While it is true that New Hampshire, Pennsylvania and Connecticut have heretofore produced small quantities of garnet, still New York State remains pre-eminent in the production of this natural abrasive, and the North River ore enjoys the reputation for superiority owing to conditions surrounding its birth eons ago.

Looking West from the Top of the Quarry Towards the Settling Basin and Beyond to Thirteenth Lake.

The consumption of garnet in the United States has been around 6,500 tons annually. Spain is the only other country which produces this ore in any quantity. Its production, however, is

said rarely to exceed 2,500 tons per year. An idea of the importance of the North River operation may be gained when it is understood that its present production is about 5,000 tons or about 80 per cent of the annual consumption.

The commercial value of abrasive garnet depends upon its hardness, toughness, manner of fracturing and purity. The grains, crystals, or masses of the garnet must be large enough to yield, when crushed and screened, particles of sharply angular form, and of varying sizes to meet the requirements for different grades of abrasive papers. Therefore, a laminated garnet, which will break up into relatively sharp, angular grains, is most to be desired. It is the sharp cutting edges of the abrasive that do the work for which garnet papers are employed.

Two types of veins, characterized by the relative amounts of hornblende and feldspar in the gangue, are being worked in this district. In the Hooper deposit, the feldspars are predominant; and the vein is apparently of an older type, lying as it does in a geological horizon several hundred feet deeper than the hornblende type.

Garnet paper as a competitor of quartz sandpaper was first brought out in the "eighties," and has won widening recognition ever since because of qualities which distinguish the garnet abrasive from the quartz-sand abrasive.

On hardwoods, such as oak, maple, hickory, chestnut, walnut and mahogany, some authorities state that quartz is scarcely better than 60 per cent as efficient as garnet. On some white pine it is about 85 per cent as efficient, and on gummy yellow pine the quartz sand is about the equal of garnet.

Quarry Operations

The accompanying illustrations indicate clearly the mountainous character of the country, the height of the quarry face and the scope of the excavations. The garnet rock is drilled by means of air drills and blasted out. The air for this purpose is supplied by a plant composed of two "Imperial" type X, steam-driven compressors, each having two-stage air-compressing cylinders and compound steam cylinders. There is a smaller or reserve auxiliary unit. Inasmuch as operations are carried on the year through, fully 500 feet of the air line piping is exposed to the atmosphere in the open cut of the quarry, and is called upon to furnish air to the pneumatic drills when the temperature is 30 or 40 degrees below zero. To prevent moisture in the pipes from freezing, the line has been fitted with a Lunkenheimer No. 6½ Emblem sight-feed cup from which wood alcohol can be fed, drop by drop, into the main. A pint of alcohol daily will keep the line clear in the coldest weather.

After blasting, the rock is loaded into cars by hand and by steam shovel. The shovel used is an 18-B Bucyrus. It is equipped with a ⅞-yard manganese steel dipper which is made necessary because of the extremely severe service it must face in handling this rock, which is of such a character that it does not break up well in blasting. This machine was installed during the War in March, 1917, when the lack of labor made it essential to put in a mechanical form of loading. It has been in quite constant operation ever since, and has given excellent service despite the difficult character of the digging which is encountered.

The shovel loads 160 to 170 tons of garnet-bearing ore per day. This is loaded into wooden cars with a capacity of 9 tons each. These cars are iron lined, 7 feet long and 5 feet wide. For hand loading they are fitted with 20-inch size, with open ends. For service under the shovel one end is closed, the other is equipped with a door.

This is extremely heavy duty for a small shovel as may be seen by the condition of the house. This 18-B Bucyrus has been at work in this quarry since March, 1917. It has sped up the work of handling the garnet-bearing rock.

When the loading is done by hand, which is necessary under some circumstances, two men lift a large rock on a bent bar while a third man balances the rock; and they are so expert at this that it is practicable for each loader to average anywhere from 16 to 20 tons a day. Experienced hands do load from 25 to 27 tons in this way. Another hoisting engine, also air-driven, is located on the platform leading to the crusher chute where it helps in handling the dump cars.

The rock, just as it has been shattered by blasting, is moved in cars from the working level of the quarry to a chute leading to the primary crusher intakes. The ore drops on to a grid or grizzly fashioned of railroad rails spaced so as to leave openings four inches wide. Should any of the pieces of rock be too large to be fed to the crushers, they are lifted out, by means of an air-operated piston hoist, for breaking. The ore, after dropping by gravity through the grids, joins the product from the primary crusher and is fed to two smaller jaw crushers. From the crushers, the rock goes through four sets of rolls; and when issuing from the latter the broken material ranges in size from one-quarter inch downward. Farrel-

The type of car used for hand loading, with 22-inch sides and open ends. Two men lift a rock on a bent bar while a third balances.

Bacon jaw crushers, 36-inch x 24-inch, are used. All undersize material coming from the rolls is disposed of by shaking screens. After leaving the screens, the ground ore is run to a storage bin, and fed to a roughing machine which gets rid of the coarse, waste rock. Next, the partly concentrated ore descends through iron-lined chutes for further treatment in the separating department of the plant.

Like the plants of kindred industries, the buildings of the mill of the North River Garnet Company are placed successively upon the hillside so that the raw materials can descend by gravity through each operating stage until the granulated rock arrives at the vanning jigs, which separate the garnet particles from undesirable impurities.

After leaving the last of the vanning jigs, the final garnet residue or tailings are treated on a concentration table. The garnet obtained here is subsequently treated dry by a Hooper pneumatic separator, after which the garnets are fed into bags. The fines so reclaimed are mixed with the

An Ingersoll-Rand "Butterfly" Drill at Work in the Face of the Quarry

coarser and the wet concentrates from the other jigs, and all the material is elevated to a drier from which the dried garnets are fed into sacks and prepared for shipment.

Until within the past few months, drilling and blasting operations have been limited to the single quarry located on the mountainside well above the mill. As that outcropping is being cleared away, Mr. Hooper has deemed it advisable to attach the deposit at a lower level, and he has therefore built a cableway capable of spanning both the upper and the lower levels of the ledge so that it will be practicable to handle and to load cars on both of them — the tracks running parallel and delivering the quarried rock to the crusher chutes.

Because of the comparatively isolated scene of its activities the North River Garnet Company has established an industrial settlement where most of the workers live. Everything within reason is done for the welfare and the happiness of the operatives and their families; and as Mr. Hooper spends most of his time on the property he is able to exercise a sympathetic supervision over the community. The working force at the mine and the mill numbers 110 men.

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A New Louisiana Gravel Plant

The Monroe Sand and Gravel Company's Plant at Monroe, Louisiana, Will Soon Be Operating Three Dragline Excavators and One Railroad-Type Shovel, Turning Out Material for Louisiana's Roads

MR. T. E. STEPHENSON of Shreveport, Louisiana, President of the Louisiana Sand and Gravel Company, and well known in the sand and gravel industry of the South, organized the Monroe Sand and Gravel Company of Monroe, Louisiana, on November 22, 1922, and incorporated the same a month later.

This company has in its holdings a conservative estimate of seven million yards of gravel deposit in Ouachita Parish in the northern part of that state in West Monroe across the Ouachita River, four miles west of the city of Monroe.

The plant has a most favorable location as well as a product for road-building purposes, being located on the Dixie-Overland Highway and the Vicksburg, Shreveport & Pacific Railway.

The pit contains 310 acres of gravel deposit, with overburden 2½ feet deep on an average, and gravel probably 30 to 40 feet deep.

The plant was started about eight months ago, and up to the present time it has had all the business it could take care of in pit-run gravel for road-building purposes, a large amount being used in the construction of the Dixie-Overland Highway from Monroe to Ruston, Louisiana. They have large contracts with the Louisiana State Highway Department and the surrounding parishes for this purpose, the daily orders for such purposes averaging 45 cars per day. This operation is another example of the growing importance in the development of such plants for satiating the ever-increasing appetite for material for road construction.

The Deposit

This deposit averages 65% to 70% rock with about 26% sand and 20% clay, according to the tests of the Highway Department's Inspector made daily before the gravel is shipped. The top stratum of the deposit has a considerable iron deposit cemented into the rock, making stiff digging. The clay is not in strata or in large pockets, as is frequently the case, but is intermixed with the gravel from top to bottom.

A standard gauge railroad about a mile in length has been built connecting the pit with the main line of the Vicksburg, Shreveport & Pacific Railway at a point called Steven, Louisiana. In conjunction therewith there are two sidetracks, each 1200 feet in length, one used for empty cars and the other for loaded cars ready for shipment.

Plant Operation

Active work on the plant was started in March, 1923, at which time the above-mentioned spur was built, the grading for which was done with a 20-B Bucyrus dragline excavator with a 35-foot boom and a ¾-yard bucket, recently purchased by the company.

Bucyrus 20-B dragline excavator with a ¾-yard bucket and 35-foot boom, stripping 2½ feet of overburden from the gravel deposit. The new washing plant under construction may be seen in the background.

Upon the completion of the railroad, gravel loading operations commenced. The equipment for this purpose was a Class-45 Atlantic-type shovel with a 2-yard dipper. The small Bucyrus dragline is being used for stripping purposes and for loading gravel into wagons for local use.

The Atlantic is now in use constantly, loading from 35 to 40 cars per day. The shovel loads 12-yard dump cars, ten of these being in service.

The 20-B, above mentioned, was purchased with both shovel and dragline equipment, as the former with a ¾-yard dipper, and as the latter with a 35-foot boom and a ¾-yard bucket. It is mounted on caterpillars. When equipped as a shovel it is used for loading gravel, and as a dragline for stripping overburden, as stated. This dragline when used for loading gravel, which it occasionally does, loads 15 standard gauge cars in 10 hours, with 32 to 35 cubic yards per car. This means 480 to 575 cubic yards per day.

Two locomotives are in use, one 65-ton and one 50-ton.

Washing Plant

A washing plant has recently been completed. The gravel is taken from the pit in 12-yard cars, the cars dumping the gravel into a pond 20 feet deep and 80 feet long.

A 10-inch centrifugal pump pumps the gravel from this pond on to the screen through a pipe of the same diameter. This screen is 8 feet wide and 10 feet long and is of the dead or stationary type, with ¼-inch openings. It is possible this may be replaced later on by a 20-foot screen.

The gravel rolls down the screen into a hopper and then into cars by gravity. The water goes through the screen into another hopper, and is carried by a long trough three feet in width and one foot deep, into a settling tank and then runs back again into the pond above mentioned.

The sand goes into this hopper, from there into another car opposite the gravel car. Both sand and gravel are located at the same time.

The washing plant consists of a 250 H. P. boiler, a 240 H. P. engine and a 10-inch pump.

This method of elevating gravel by the pump system onto a screen has proven most satisfactory, and Mr. Stephenson states is the best conveying method he knows of.

The gravel is thoroughly washed by the force of the pumps through the pipe and produces a very clean product.

The gravel gets a final rinsing on the screen. Another pump pumps clear water from an artesian well through a 4-inch pipe which, at the screen, is reduced to three two-inch pipes running across the screen. These pipes have ¼-inch perforations on the bottom, thus producing a spray for the rinsing process.

This plant was started the latter part of November and has a capacity of 15 to 20 cars per day, out of which number there will be about four cars of sand.

The same machine with shovel equipment, building the spur for the Monroe Sand and Gravel Company's new plant, Monroe, Louisiana

Excavating Equipment

In addition to the Atlantic railroad-type shovel and the small caterpillar combination shovel and dragline, the company will soon have in service a Bucyrus Class-20 dragline excavator with a 2½-yard bucket and a Class-14 Bucyrus dragline excavator with a 60-foot boom and a 2-yard bucket. These four machines will easily load 100 cars per day and do the stripping.

The pit deposit is dug from a bank on a hillside, consequently the pit is dry. Later, however, it may become necessary, when the water level is reached, to load in water. The dragline, however, is well adapted for such service.

The officers of the company are M. E. Martin, President; T. E. Stephenson, Active Vice-President and C. C. Houston, Secretary-Treasurer.

The directors are W. C. Liggett, M. E. Martin and Harry Sigel of Dallas, Texas, C. C. Houston of Lewisburg, Tennessee, and T. E. Stephenson of Shreveport, Louisiana.

The company is to be congratulated in having two men of the calibre of Messrs. Stephenson and Houston in active charge of operations, as both have an unusual amount of practical experience in gravel plant operation.

We are indebted to Mr. Stephenson for the information upon which this article is based.

Old Site of Battery Park Hotel at Asheville, North Carolina, Fast Disappearing

How the Excavating Company of Asheville, North Carolina, Are Handling Their 600,000-Yard Contract on Old Hotel Site

IT will only be a matter of a very few months when the hill, where once stood that famous old hostelry, the Battery Park Hotel, at Asheville, North Carolina, will be a memory, just as the hotel itself is now.

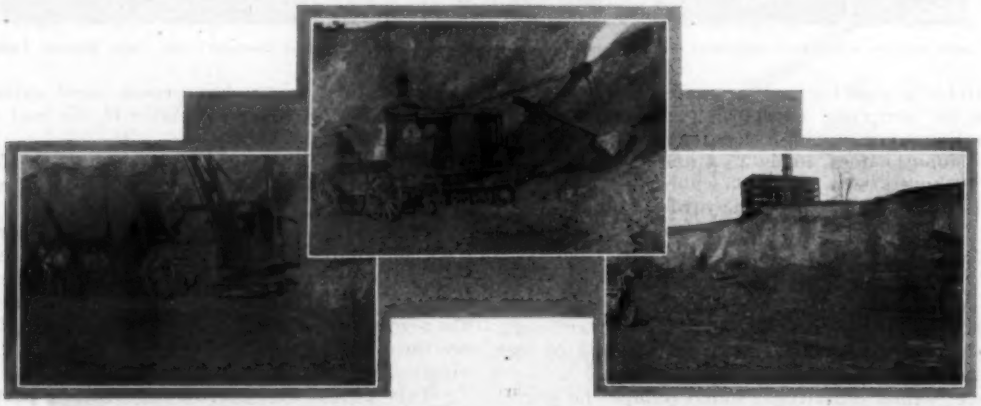
Made famous by many tourists, notables of finance and history, that old hotel has stood its ground for over forty years. Today a new Battery Park Hotel is being built in its place, and the hill upon which the old hotel once rested is being cleared away. This work on this hill alone will involve some 600,000 yards of excavation. It is 50 feet high, and covers an area equal to several city blocks.

The contract for the excavation is in the competent hands of the Excavating Company of Asheville, North Carolina, of which Mr. Clyde Reed is president.

Three steam shovels are handling the job, a Bucyrus 20-B and a Bucyrus 14-B owned by the Asheville Construction Co., and a Thew shovel owned by the Wells Construction Company, both companies being local concerns. All three of the shovels mentioned are ¾-yard machines.

The Bucyrus 20-B and 14-B machines are loading into about 35 dump wagons, while 15 wagons serve the Thew.

At the time of writing, 300,000 cubic yards have been removed. Work was started in January of last year, and for the first few months the 14-B was the only shovel on the job. Some time later the other two shovels were put on to the work.



Views of the Excavating Company's Contract at Asheville, North Carolina. The view to the left shows the Bucyrus 14-B with the 20-B in the background. The center view shows the 20-B cutting into the side of the bank. The view to the right shows the hill being cleared away, with the framework of the new hotel in the background.

These boys are making the dirt fly on the Excavating Company's Contract at Asheville, North Carolina. Reading from left to right in the first view are Robert Lane, operator, and R. Davis, fireman, on the 14-B; second view, Robert Cabe, operator, and Bruce Lane, fireman, on the 20-B; third view, John Powers, superintendent on the job; fourth view, J. J. Lyons, operator, and Albert Lunsford, fireman, on the Thew.

The 14-B which originally started the work has an interesting record, having averaged 10,000 cubic yards a month since its installation on this job. Although it is four years old, and has seen some exceedingly hard digging in its career, it has had only four serious breakdowns, none of which caused over a single day's delay at a time.

The Bucyrus 20-B was put on to the job some time after the first of the year and has been more than satisfactory. Recently, at a time when a number of wagons were congregated after the lunch hour, when the machine could be kept steadily busy for a few minutes, it loaded fourteen one-yard dump wagons in 6 minutes. Figuring one yard to the wagon, this would amount to 140 yards per hour. The operator was not aware that he was being timed.

A great deal of time is lost in waiting for dump wagons. They are delayed considerably, since they are forced to go through heavy traffic on the way to the dump, and the traffic in this particular section of Asheville is at times very heavy.

Robert Cabe is operating, while Bruce Lane keeps things hot on the 20-B. Robert Lane is operating and R. Davis is shoveling the coal on the 14-B, while J. J. Lyons is handling the levers and Albert Lunsford is keeping the steam on the Thew shovel. John Powers is superintendent on the job.

Work on Famous "North Forty" on Minnesota Iron Range Begun

Stripping operations were started January 22 on that famous old battleground at Hibbing, Minnesota, near the southwest corner of the viaduct that spans what is known as the Sellers-Hull-Rust Approach.

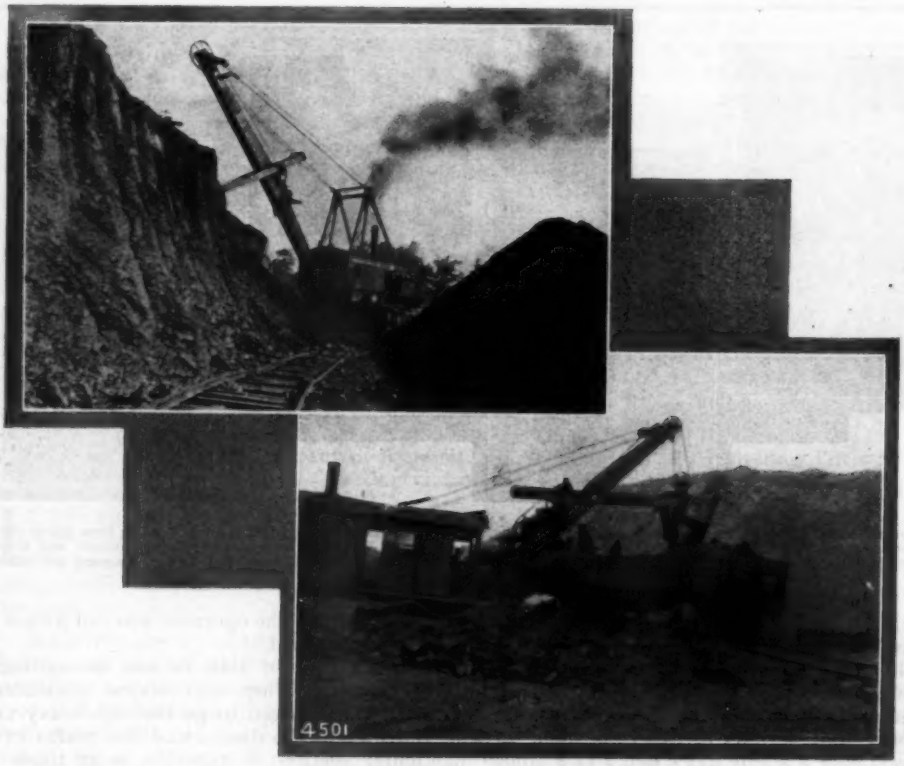
It is several years since the Oliver Iron Mining Company began preparations for mining the body of ore underlying this forty. The first step that had to be taken was the acquisition of the surface rights. Negotiations with the people who owned the lots and buildings on the forty dragged over a period of about three years. In the meantime and since the company has been kept from working by actions brought in the court seeking to prevent it from proceeding with the work until it had bought up property in two platted and occupied additions to the south. The litigation has been going on for four years, and there is still an appeal to the State Supreme Court in the process of being perfected.

The ore body the company has sought to get at is believed to contain a large tonnage of iron ore. It is also believed that the ore will be of as high grade as any deposit on the Mesaba Range, but only thorough development will prove either the quantity or quality of the deposit.

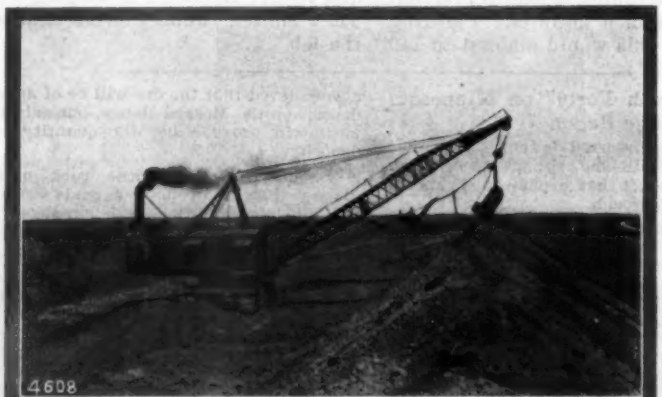
Should the development work on the North Forty disclose that the ore body extends southward, underlying the Pillsbury addition, it is predicted that the owners of surface property of the Pillsbury and Southern additions will be able to sell their surface rights and improvements at attractive figures.

In the meantime, there will be benefits accrue to the property owners of these additions, through the large number of men that will be employed in developing the North Forty, it is pointed out. Most of the men employed on that work will want to live near the mine, and, consequently, houses and furnished rooms will be in demand for several years.

It is understood that a large crew of men will be employed on the work of developing this new mine, or, as some prefer to term it, this forty-acre enlargement of the Hull-Rust, Mahoning, Sellers, Burt, Pool and Day open pit.



We publish herewith views of the Harris Collieries Company's coal-stripping outfit at Island, Kentucky. The 225-B Bucyrus shown at upper left is working in three shifts. The operators are A. A. Gant, G. C. Ray and J. D. Morris. The cranesmen are George Philips, Will Cradock, and J. C. Butler. G. F. Wells, L. A. Allen and W. A. Pinkston are oiling, and Joe Clayton, L. B. Bell and George Hall are firing. The 50-B is being operated by J. M. Yarbough, with John Easterwood firing. A. L. Oldacre, formerly of the Pratt Consolidated Coal Company, is superintendent. We are indebted to Mr. J. D. Morris for these views.



Canal work in the Soudan, Northern Africa, showing a Bucyrus Class-14 owned by S. Pierson & Sons, who have the entire contract for the great Gazera Canalization Scheme. Three Class-175, four Class-24, one Class-20 and two Class-14 Bucyrus Draglines are in use on this work.

The above view was ... us by ... Pacific Bulletin, and ... Bucyrus ... operating in the Southern ... Railro... Quarry at Lucin, Utah, ... ock ball ... for their double-tracking ... lines acr... and through Nevada and ... Mr. ... the engineer who has ... this mach... years, tells us that this ... worke... Lake Cut-off in 1902. ... we... rock, and it is averag... yards ... material at the present ... being u... between Wells and Mont... Nevada. ... is craning, while Claude ... is firi...

Shovel operation in the spruce forests of Washington. The above view was taken at the Wyanooche Timber Company's Operation at Hoquiam in the State of Washington. The machine shown is a Bucyrus 20-B shovel, equipped with a wood-burning boiler, and is working on a spur from the Wyanooche Timber Company's main road, which starts at the Wyanooche River at a point about three miles west of Montesano and extends up into the timber for a distance of about 14 miles.

...s by the Southern ...Bucyrus 85-ton Shovel ...c Railroad Company's ...ock ballast is obtained ...lines across the Sierras ...Mr. A. J. Knight, ...his machine for twelve ...worked on the Salt ...ent work is in lime ...0 yards a day. The ...being used for ballast ...evada. Lee Hardisty ...e is firing the shovel.

The Davis Bridge Dam at Whitingham, Vermont, is the highest earth dam in the world built by the hydraulic fill method. The dam was to be completed by December 1, 1923, but cold weather prevented the completion at that time. The photograph published herewith is a Bucyrus Class-24 owned by W. P. Carey Co., Inc. and was sent to us by E. J. McElroy, who is operating one of the machines on the work.

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Business Outlook

The trend of business in the first part of the new year has strengthened the feeling of confidence which developed toward the end of 1923.

In mid-summer there were widespread misgivings that the state of industrial activity would not last through the year, but as the fall season passed it became evident that business was well sustained and possessed of staying power able to carry it very much farther. The volume of fall business was somewhat diminished by the unusually mild weather, which played havoc with the bituminous coal industry, but notwithstanding this influence railroad traffic was heavy up to the holidays and, excepting the seasonal industries, employment was but slightly affected.

The steel industry, always a good index to general conditions, is again receiving orders in excess of shipments, and is operating at 80 to 90 per cent of capacity, which facts indicate that business in general is on the upgrade.

Winter building contracts have been on a larger scale than ever before, and there is good reason to expect that operations will be at capacity well into the summer at least.

Some strong railroad companies have already announced programs for the current year. Forecasts of capital expenditures are given by the *Railway Age* as follows: Atchison, Topeka & Santa Fe, $70,000,000; Pennsylvania, more than $50,000,000; Illinois Central, $45,000,000; Southern Pacific, $40,000,000; Norfolk & Western, $15,000,000; Erie, $5,000,000. New York Central has carried over $18,000,000 of unfinished work.

Companies whose financial resources are not so certain are deterred by the threats of adverse legislation at Washington. Capital expenditures call for new money, and the companies must go to the public market with bonds or stocks for sale. Congress has the power to limit the earnings of capital invested in railroads, but no power to compel the investment of new capital in railroads, a limitation upon its authority which some members of that body do not seem to take into account. If the railroads are let alone, the prospect is for large expenditures upon them, and these will be an important factor in the general business situation.

The most potent factor in the present good prospects for business is the probability of tax reduction.

The progress of the Mellon program indicates that substantial reductions certainly will be made, but the outcome upon the higher schedules is yet undetermined. This is precisely where the largest benefits to the business community, and hence to general prosperity, are to be secured.

In spite of the low price of coal, some new properties are still being developed, and those operators having the most modern equipment are still able to keep their heads above water.

Altogether the prospects seem bright for business to run along on a very even keel for the next six months at least. After that our prosperity will be pretty much in the hands of the voters.

During the week of January 26th, at a meeting of the Associated General Contractors of America, held in Washington, D. C., Frederick L. Cranford, Brooklyn, New York, was elected president of that organization for the coming year. Mr. Cranford, who is president of Frederick L. Cranford, Inc., succeeds John W. Corper, of Buffalo, New York.

A. S. Downey, Seattle, Washington, was elected vice-president-at-large, while the other vice-presidents include Leonard C. Watson, Boston, and H. H. Wilson, Harrisburg, Pennsylvania.

The directors elected were: W. A. Rowan, New York City; T. J. Baker, Milwaukee, Wisconsin; Henry Ericsson, Chicago; Nat MacDougal, Portland, Oregon; and H. W. Baum, Salt Lake City. The vice-presidents and directors are to hold office until 1927.

All of these men are well known throughout the contracting world, and have come up through the ranks with full accomplishment of their tasks in the past, and show a splendid record of achievement. *The Excavating Engineer* wishes them the best of success in their new duties.

Sandy McNabb took a sixpenny ticket at a raffle for a pony and trap. He won it. Was he pleased at his good fortune? Not a bit. When the pony and trap were brought to him he surveyed them gloomily and said: "I tell ye the whole thing was a swindle."

"What's the matter?" asked his friends.

"Where's the whip?" demanded Sandy.

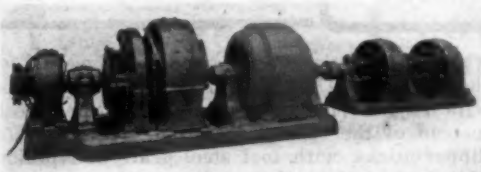
· FIELD NOTES ·

Ward-Leonard System of Control for Electric Shovels

The electric shovel is so efficient and satisfactory that its use is becoming general. Ordinarily, electric power is brought to the "location" in the form of alternating current, because its voltage can be raised by transformers for transmission to a distant point over small wires. At the location, the voltage can again be dropped by transformers to a convenient voltage for use. This lowered-voltage alternating current is brought up to the shovel by a flexible cable, and thence through slip rings that allow the shovel to revolve without discommoding the circuit.

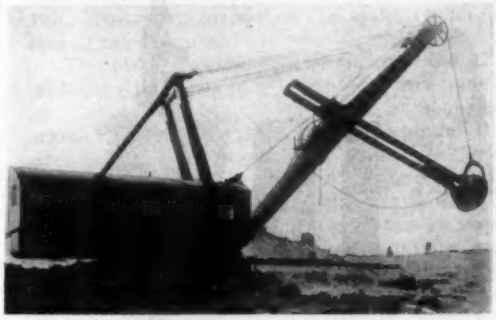
In applying power to the various shovel motions, certain speed and torque characteristics have been found to be highly desirable. These must be such as to give the maximum speed of motion with minimum strain on the mechanical parts. It is a well-known fact, that, of two horses having equal strength, one may lean into the collar and bring along the load without trouble, while the other may jump into the collar and break the harness without starting the load at all.

The Ward-Leonard system of direct current control as applied to General Electric Company machinery is almost ideal for meeting all the conditions of applied power, combined with certainty of action and absence of trouble. In general it functions as follows:



Synchronous Motor, Three Direct Current Generators and Exciter for Electric Shovel Using Ward-Leonard Control System — The Machines from Left to Right Are: Exciter, Hoist Generator, Synchronous Motor, Swing Generator and Crowd Generator

If one direct current motor is wired to one generator, that motor can be put through its paces by simply varying the small amount of current that goes through the generator field coils. In its application to an electric shovel, each motion has its own motor and each motor has its own generator. The three generators are all driven together by one synchronous motor operating from the alternating current source. The synchronous type of alternating current motor is used because it corrects the power factor; i. e., it makes all of the station and transmission line capacity available for work where otherwise an undue amount of this capacity would be dissipated as heat. A small direct current generator, also driven by the synchronous motor, furnishes exciting current for the synchronous motor fields and generator fields. The direct current motors are series wound; i. e., all the load current passes through the field windings so that their strength depends entirely upon the current which the motor is pulling at the moment.



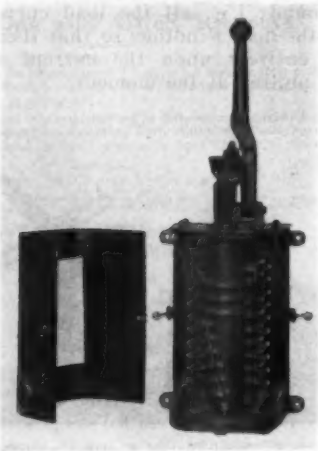
A Bucyrus 225-B Electric Shovel Equipped with General Electric Drive Using the Ward-Leonard Control System

The variable resistor in the field circuit of each generator makes it possible independently to raise or to lower the voltage of the generators, thereby speeding up or slowing down their attached motors. In addition the generator fields have windings in the opposite direction through which the main power current flows. Under normal conditions this has little effect, but, in the event of a heavy overload, this bucking winding can practically kill the effect of the regular field winding, thereby cutting the generator voltage to a low value, and either slowing the motor down to a point where its load is relieved, or stalling the motor without harm to itself or to the attached mechanism.

It would be possible to reverse the motor under Ward-Leonard control by dropping the generator field current to zero, and then bringing it up in the opposite direction. In practical shovel operation, however, reversal of motors is accomplished by dropping the generator voltage to a low value, and then operating magnetic contactors which reverse the current through the motor field. The controllers are arranged with vertical handles, and the attached mechanism has the least weight and operating friction that is consistent with long life and absence of trouble.

Forward and reverse motions follow the control handle in natural sequence, with nothing to distract the operator's attention. On one-man

shovels the crowd motion is foot-operated, and the dipper trip motor is controlled from a push button on one of the master switches. The smooth and rapid operation of this equipment is remarkable. It responds quickly to every mood of the operator, yet is limited in torque and speed in such a way as to make it practically impossible to do damage.



Electric Shovel Master Switch for Controlling by Small Current Motors Using Heavy Current Ward-Leonard Control System of General Electric Company

The functions of the various pieces of apparatus are easily understood, and the electrical wiring is simple and can be easily traced. The sturdiness of the equipment is exceptional. The motors are of the standard mill type, acknowledged to be one of the most substantial designs ever brought out for commercial application. The contactors are few in number, and are designed successfully to withstand vibration and rough usage. The speed-regulating resistors have to handle only the comparatively small generator field current, and this is a marked characteristic of the Ward-Leonard control system.

The electrical manufacturer, the shovel builder, the owner and the operator, all find points of marked superiority and advantage in this over any other type of controller. The operator, most of all, being in direct contact with the apparatus, quickly notes the easy, trouble-free operation of this, the most successful type of electric shovel operation.

Further information relative to Ward-Leonard control for excavating machinery may be obtained by addressing Power and Mining Department, General Electric Company, Schenectady, New York. Postal enclosed in this magazine may be used for this purpose.

DEVICES YOU OUGHT TO KNOW ABOUT

Improvements in Hoar Shovels

The Excavating Engineer has for a number of years been devoted to the field of excavating machinery, and its scope has included all sizes of steam, gasoline, oil and electric power shovels. Here, however, is a "Baby" shovel that might be of interest to our readers, which is being built by The Hoar Shovel Co., Duluth, Minnesota, and which includes a good many improvements over the old type. The new shovels are now equipped with Taylor-Wharton removable lip dipper teeth, instead of the old solid section, with cast steel dipper sticks, with tool steel gears and pinions, with tool steel carriage rollers and pins, special chrome nickel crank shafts in the engines, oil cellar track wheels, improved lubrication system throughout, and iron, rigidly braced 10 inches square at center, 5 inches square at each end. Four-inch box channel extension gives over-all length of boom 25 to 30 feet. This boom has swinging range of 160 degrees.

Hoar Shovel at Work on Pipe Line Trench

Scraper is self-filling, all steel, 48 inches wide without rooters and cutter. It has scraper speed of 150 feet per minute, return speed of 250 feet per minute.

Cable drums: Drums are 9⅜ inches in diameter with clutch and brake controls. The drag cable is ⅝-inch wire cable, operating at a speed of 150 feet per minute. The hoisting cable is ½-inch wire cable, operating at a speed of 250 feet per minute.

Barco Joints in Hydraulic Lines

Hydraulic lines in mining and other work are subject to considerable rough handling and vibration, and it is desirable that some flexibility should be provided in these lines.

In addition to the required flexibility for the above purposes, flexibility is also desirable from the standpoint of operating efficiency and economy, as by using Barco Joints with iron pipe, it is possible not only to secure ample flexibility for all purposes, but it is further possible to provide for any pressures required with absolute safety.

Flexible connections made of Barco Joints and iron pipe are very rugged and strong, and will last as long as any other part of the mining machinery, with no danger of interference in operation from unexpected trouble developing.

Hydraulic lines are often laid over rough and uneven ground, and by using Barco Joints in these lines considerable economy may be effected, not only in laying the lines but in building temporary supports or trestles.

The Bear-Walsh Plow

Those charged with keeping the roads open in winter, and particularly those located in a section where snow removal is a real community problem, will be interested in the November issue of "Bear Facts," issued by Bear Tractors, Incorporated, 53 Park Place, New York, New York. This particular issue shows some impressive views of Bear tractors opening up roads so drifted with snow as otherwise to be impassable.

A very great deal of attention has been paid in late years to the highways, and this feature is not being overlooked by this aggressive concern. Associate manufacturers have perfected a "V"-shaped plow, especially adapted for use with the Bear, and, according to users throughout the country, it is a very capable combination. Three outfits were delivered to one town in Massachusetts this month, two going to the City of Worcester, and the third one to the Conlin Bus Lines, Inc., Worcester, for use on the highways on which their lines operate.

The plow itself is 48 inches high and 11 feet wide at the bottom. The blades are made up of ¼-inch open-hearth steel, and at a curvature which fairly throws the snow off the blade. Blades are welded to a supporting framework. Each blade is made in two pieces, and the end or blade wing is connected by two butt straps with bolts, so it can be readily dismantled when so required for shipping, storing or passing narrow spaces. Side members are 6-inch standard structural channels, and are attached to the plow with the use of gusset plates. Plow is pulled in regular draft by attachment of tractor drawbar to its frame, which frame admits the tractor therein. All parts are well painted for preservation.

Anyone interested in complete details of this equipment will secure same promptly on application to Bear Tractors, Incorporated.

SHOTS FROM THE FIRING LINE

Central States Notes

BY M. J. WOODHULL, J. J. GAULT, W. G. PARROTTE AND FRANK B. SMITH

Mr. W. E. Lennane, general contractor, of the City of Detroit, Michigan, is under contract for track elevation work on the Grand Trunk Railroad, through the City of Detroit, where they are widening the roadbed, raising viaducts and bridges. This work is of considerable magnitude, and will probably take several years to complete.

Mr. Lennane has had several Erie machines on this project, and has just purchased a Bucyrus 50-B, which will enter on this work around the first of March at Congress and Dequindea.

As it is felt by Mr. McGuire, who is general superintendent for Mr. W. E. Lennane, the output demanded on this work is such that the 50-B is the ideal machine for same.

The Foundation Company of Pittsburgh has the contract for all excavating for the electric plant that is now being built at Philo, Ohio. This plant is one of the largest of its kind in the United States. Its coal consumption is about 3000 tons per day, and this coal is to be furnished by local coal companies, Blanchard Coal Co. getting a large contract. These people all have Bucyrus equipment. The Foundation Company have a Bucyrus No. 45 on the excavating work of this plant. Mr. McKenzie, superintendent for this company, stated that after several years of hard service he has found that putting a bushing in the boom base is the only thing, as same has not worn a bit after years of hard service.

Spitcaufsky Bros., 2452 Benton Boulevard, Kansas City, Missouri, were low bidders on 310,000 yards of excavation for the new Kansas City water reservoir. Most of this will be rock.

Norton Bros. have finished the basement job at 10th and Wyandotte for the new Kansas City Board of Trade Building.

Lomerie & Chambers, 3529 Highland Avenue, Kansas City, Missouri, have their shovel busy on basement work for J. L. McQuaid.

Luck Bros. are progressing nicely on their contract for the Kansas City Southwestern Railroad at Kansas City, Kansas.

The Mid-Continent Fuel Company of Kansas City, Kansas, are moving their 175-B Bucyrus purchased from Perry-McMahon Coal Co. at Rich Hill, Missouri, to their coal land near Wagoner, Oklahoma.

Northwestern States Notes

BY A. B. HANCE, PORTLAND, OREGON

The contract for building the road from Deer Park to the Pend Oreille Highway near Milan has been awarded to Campbell & Barr of Spokane for a consideration of $60,000. Work will begin at once.

The last link of the The Dallas-California Highway in Wasco County is on the verge of being placed under construction by the State Highway Department. The Sherman Highway in Wasco County and the Columbia River Highway between Quinton and the Morrow County line will be resurfaced. This means that by the time summer arrives more than 50 miles of the Dallas-California Highway in Wasco County will be under construction, and that in addition, 20 miles of the Sherman Highway, when completed, will join that important system to The Dallas-California Highway at the head of Cow Canyon. The Dallas-California Highway Section to be completed passes from the south end of the Maupin unit through Criterion to the head of Cow Canyon. The Sherman Highway unit extends from the southern boundary of Sherman County through Shaniko and thence to Cow Canyon. The former contract will cost the combined State and County Highway Fund approximately $70,000, while the Sherman Highway construction will cost in the neighborhood of $80,000. The resurfacing of the Columbia River Highway between Quinton and the Morrow County line would be done in three units, at an approximate cost of $50,000.

The Portland firm of Kelly & Sullivan has been awarded a contract for building the grade for 11½ miles of the Southern Pacific's Eugene-Klamath Falls Cut-off from a point five and one-half miles southerly from Oak Ridge.

Bids will be opened in March or April to macadamize the nine miles of road now being constructed between McCloud and Cascade Gorge on the Crater Lake Highway. Work to be done without cost to the county. The Green Springs and the Siskiyou Mountain roads will also be widened where necessary for safety, and the ditches will be drained at the state's expense. The State Chamber of Commerce and County Judges and County Commissioners passed resolutions asking Congress to appropriate $280,000 to complete roads in Crater Lake National Park. The expenditure of $42,000 on the upper Blue Ledge Road to connect with the Klamath River Highway in California has been recommended.

Federal aid aggregating $465,000 was assured to Idaho roads after a meeting recently between United States Engineers and State Commissioners. Of the amount $245,000 will be expended on Northern Idaho roads, $190,000 on roads in the southern part of the state in grading and surfacing, and $30,000 for maintenance. Northern Idaho projects which will benefit are: Bonners Ferry-Leonia, $25,000; Elk City Highway, $75,000; Lolo Pass $100,000; Coeur d'Alene Yellowstone, $4,500. In southern Idaho the projects which will receive attention are: Ketchum-Clayton, Blaine County, $50,000; North Fork, Payette River No. 2, $65,000; Soda Springs-Freedom, Caribou County, $30,000; Victor-Irwin, Teton Pass, $45,000.

Bids were opened at Olympia recently by the Washington State Highway Commission on three state projects and one project for the Government Bureau of Roads. They were as follows: Clearing about 10.1 miles of the Olympic Highway from Lunch Creek westerly in Grays Harbor and Jefferson Counties; surfacing with crushed rock about 10 miles of the Inland Empire Highway from Spangle northerly in Spokane County; clearing about 24.4 miles of the Olympic Highway between the Hoh River and the north line of Quinault Indian Reservation in Jefferson County. The contract for the latter was left to C. A. Strong at a bid of $146,869.50.

More than 45 miles of forest highways will be constructed in Montana and northern Idaho during the coming year. Of the highways to be constructed, 27½ miles will be located in Montana and 18 miles will be located in northern Idaho. The money is distributed so that Montana will receive $375,000 and Idaho, $170,000. In addition to these funds, $10,000 is made available for the maintenance of forest roads in Montana. All these roads are to cover new contracts, and do not apply to projects which now are under construction but not completed.

The Oregon State Highway Commission on the 5th of February let three road contracts as follows: Coquille-Bandon Section of Roosevelt Coast Highway in Coos County, 16.9 miles of broken stone or crushed gravel surfacing was awarded to the Johnson Construction Co. of Portland at a bid of $163,835; Criterion-Cow Canyon Section of the Dallas-California Highway in Wasco County, 14.10 miles of grading, to Bauers & Bauers, Dayton, Washington, at a bid of $69,952; Lone Pine-Telocaset Section of Old Oregon Trail in Union County, 15.5 miles of broken stone resurfacing, to Ekstrom & Co., Spokane, Washington, at a bid of $51,420.

Pacific Coast News

BY P. H. BIRCKHEAD AND JACK SACKETT

Contract has been awarded to the Utah Construction Co., Phelan Building, San Francisco, at about $400,000, for the construction of railroad from Avalon to a bridge across the Colorado River, for the Southern Pacific Company, 65 Market Street, San Francisco.

Specifications have been started by the Bureau of Public Roads, United States Department of Agriculture, 9 Main Street, San Francisco, and bids will be called for in two or three months for the Yuba Pass National Forest Project, involving 135,000 cubic yards excavation, 10 acres of clearing, 310 cubic yards concrete, 3,500 lineal feet commercial metal pipe. Excavation consists of 500 station team work, and some steam shovel work.

Bids as follows for dredging Long Beach: (1) Channel 2—1,720,000 yards low bid from F. C. Franks, American National Bank Building, San Francisco, $.1385 per yard; (2) Channel 3—916,000 yards, low bid from San Francisco Bridge Co., Nevada Bank Building, San Francisco, $.154 per yard; (3) Turning Basin, 1,668,000 yards, low bid from United Dredging Co., 414 13th Street, Oakland, $.1469 per yard; (4) Connecting Channel, low bid by San Francisco Bridge Co., 1,174,000 yards, $.168 per yard.

Contract awarded to Dodge Bros. & Dudley, Fallon, Nevada, for grading and graveling 17.59 miles of highway between Mormon Mesa and the Nevada-Arizona State Line.

Contract awarded to Mercer-Fraser Co. for grading and graveling Peninsula Road from Somoa to the Mad River Slough Bridge.

Plans are being completed by the City Engineering Department, City Hall, Los Angeles, for the construction of six viaducts. Total estimated cost $10,000,000. Bonds voted by the City of Los Angeles in amount $2,000,000 to cover their share of the cost.

Bonds amounting to $665,000 voted by Roosevelt Agricultural Improvement District near Phoenix, proceeds bonds to be turned over to Salt River Valley Water Users Association for expenditure.

Trustees of the proposed irrigation district at Dixon, Solano County, planning reclaim and irrigation of about 30,000 acres land, have decided to form the District under the State Reclamation Laws instead of under the Wright Act, as formerly planned. The new district is to be known as the Dixon Reclamation District. It is proposed to appropriate about 600 sectional feet water from Haas Slough, 17 miles main canal will be constructed, and about 40 miles laterals. Estimated cost $1,200,000.

Preliminary plans are being prepared by Consulting Engineer J. A. Shields, County Surveyor of Placer County, for the construction of an irrigating system for the new Camp Far West Irrigation District now being formed near Wheatland. Plans call for storage dam about 55 feet high, 230 feet long, on top of concrete construction, storing water from the Bear River. A two-mile main canal will be built, and a system of distributing canals. Estimates cost $125,000.

Consulting Engineer C. R. Caudle, Stacy, Lassen County, is preparing plans for construction of works for new Irrigation District near Stacy, to embrace about 10,000 acres of land. A temporary organization of 4000 acres has already been formed, and petitions will be circulated shortly to include the balance. Following structures proposed: Concrete diversion dam, 5 feet high, 50 feet long; main canal 30 miles long, 12 feet wide on top, 8 feet wide on bottom, 2.5 feet deep; storage dam storing 32,350 acre feet water.

Ladera Irrigation District proposes to appropriate water from the San Jacinto River in Riverside County; construct two small reservoirs, pipe lines, etc., and possibly purchase existing pumping plants. The District will embrace about 4000 acres of land. Olmsted & Gillelen, Hollingsworth Building, Los Angeles, are consulting engineers; A. L. Adams, Elsinore, is secretary.

Plans being completed by engineers for San Joaquin Valley Portland Cement Co., represented by G. F. Hamburg and S. A. Parker, 608 Crocker Building, San Francisco, and work is expected to start shortly on the construction of a new cement plant at Three Rivers, near Visalia. Plans call for a plant of 3,500 barrels of cement per day capacity, a machine shop and power plant and an eight-mile railroad to be built and turned over to the Visalia Electric Railroad Co. Total cost including machinery, $1,000,000.

Plans and surveys are now being prepared by Consulting Engineer A. N. Burch Hollister, for the construction of the Hollister Irrigation District storage and irrigating system. It is proposed to appropriate and store water on the following creeks by the construction of earth-fill with rip-rap face dams, the water to be conveyed to the land within the District by main canals. San Benito Creek Dam is to be 80 feet high, 800 feet long on top, 500 feet long on bottom, 16 feet wide on top, storing about 65,000 acre feet. Trespinos Creek Dam is to store about 15,000 acre feet. Las Muertas Creek Dam is to be 70 feet high, 600 feet long on top, 200 feet long on bottom, 12 feet wide on top, 10,000 acre feet. Quien Sabe Creek Dam is to be 40 feet high, 600 feet long on top, 300 feet long on bottom, 12 feet wide on top, 10,000 acre feet. Pacheco Creek Dam is to be 50 feet high, 800 feet long on top, 600 feet long on bottom, 12 feet wide on top, storing 10,000 acre feet. All dams to be earth and rock fill type of construction, front slopes 3 to 1, back slopes 2 to 1. District includes 34,000 acres. Bond election is to be held in a few months.

An election will be held on March 2nd by the Carmichael Utility District, including 3,100 acres in Sacramento County, to vote on issuing bonds in amount of $60,000 to finance the construction of a power distributing system. Carl M. Hoskinson is consulting engineer for the district.

New proceedings are being started by the City of Los Angeles with reference to the construction of the Arroyo de la Sacatella storm sewer system to cover 16 square miles of the City of Los Angeles west of Alvarado Street. Work is to be done under the 1911 Act.

The following budget has been prepared by the Southern California Edison Co., 306 South 6th Street, Los Angeles, for the 1924 Construction program: Florence Lake Tunnel, $5,879,000; enlargement of Big Creek Plants 1 and 2, requiring 25,000 kva. unit for No. 1 and 16,000 kva. unit for No. 2, $2,100,000; diversion dam and enlarge Florence Lake Reservoir, $1,000,000; Tunnel at Huntington Lake, $700,000; distribution lines, $5,943,700; distribution sub-stations, $2,394,000; transmission lines, etc., $1,106,510; other improvements bring the total to $26,288,000.

Contract has been awarded to the Utah Construction Co., Phelan Building, San Francisco, by the Southern Pacific Company, 65 Market Street, San Francisco, for the construction of another section of the Natron Cutoff for a distance of 11.5 miles from Summit to Oakridge. Work will involve heavy grading on the 11.5 miles and also the construction of a tunnel about 2,000 feet in length. The Natron Cutoff, when completed, will extend from Oakridge, Lane County, to Kirk, Klamath County, a total distance of about 118 miles, and will include about twenty tunnels. Bids for other sections will be called for from time to time.

Contract awarded to Foundation Co., 58 Sutter Street, San Francisco, at about $1,000,000 for the construction of a new cement plant at Redwood City, San Mateo County, for the Pacific Portland Cement Company, Pacific Building, San Francisco.

Plans are being prepared by City Engineer R. D. Van Alstine for the construction of extensive improvements to the Long Beach Harbor. Work will involve a large amount of dredging, new bulkheads, etc. It is proposed to hold a bond election shortly to vote on issuing bonds to the extent of several million dollars for financing. C. H. Windham is City manager.

Contract awarded to Bates & Borland, Oakland, California, Oakland Bank of Savings Building, at approximately $18,000 for the construction of the Golf Links Road for the City of Oakland, work consisting of grading, constructing culverts, concrete, conduits and concrete end wall.

Southern States Notes

BY C. N. BALLENTINE AND W. W. WHORLEY

We regret to announce the death of Mr. G. C. Goodrich of Anniston, Alabama, from uremic poisoning. Mr. Goodrich was a prominent contractor and had done a great deal of highway construction in Alabama. Interment was held at his original home in Fayetteville, Tennessee.

Boxley Brothers of Orange, Virginia, are making the dirt fly on their double-tracking job on the main line of the Louisville & Nashville between Cincinnati and Knoxville south of Berea, Kentucky. Mr. C. W. Boxley is in charge of this work. The section north of Berea is being handled by the Macdougald Construction Co. of Atlanta, Georgia, who have subbed this work from the Brooks-Callaway Co. of Atlanta.

Dwight P. Robinson Co., Inc., have begun operations on the addition to the Findlay Yards of the Southern Railway at Birmingham, Alabama. This work includes about 125,000 yards of grading with the necessary concrete structures.

Construction of the new Ford Assembling Plant, near Riverside Park, Memphis, Tennessee, is being rapidly pushed by the Blair Construction Co. of Memphis.

The Alabama State Highway Commission will recommend to the Bond Commission the issuance of $7,000,000 worth of State Highway bonds for the 1924 program, according to announcement recently made by Senator John Rogers, Chairman of the Highway Commission, following a conference between the Governor and the Highway Commission. With the Federal funds available of around $2,100,000 there will be between $9,000,000 and $10,000,000 for Alabama's road program for 1924, if the Bond Commission acts favorably on the recommendation of the Highway body.

The Tennessee State Highway Department started off the New Year with a rush on February 8th, by awarding four Federal Aid and eight State Aid projects amounting to approximately $1,800,000.00.

Federal Aid Project No. 41, Section C, Knox County, was awarded to the Emory Construction Co., of Knoxville. Federal Aid Projects Nos. 95 and 97, Sullivan County, were awarded to the Dickson Contracting Co. of Savannah, Georgia.

Federal Aid Project No. 100, Haywood County, consisting of 16 miles of grading with drainage structures, was awarded to Little & Dean of Memphis, Tennessee. The bridges on this project, over 20 feet in span, were awarded to the Parham Construction Co. of East St. Louis, Illinois.

Federal Aid Project No. 201, White County, consisting of 14 miles of coarse stone base, with bituminous macadam surface penetration method, was awarded to Boyd-Williams of Murfreesboro, Tennessee.

State Aid Project No. 116, Perry County, consisting of 13½ miles of grading was awarded to the C. & G. Construction Co. of Hohenwald, Tennessee.

State Aid Project No. 130, Cumberland County, consisting of 15½ miles of grading, was awarded to A. M. Cook of Oneida, Tennessee.

State Aid Project No. 135, Jackson County, awarded to the General Construction Co., St. Louis, Missouri.

State Aid Project No. 139, Montgomery County, awarded to the Federal Construction Co. of Nashville, Tennessee.

State Aid Project No. 150, Coffee County, awarded to Citizens Engineering & Construction Co. of Savannah, Georgia.

State Aid Project No. 151, Coffee County, awarded to J. B. Ramsey of Lawrenceburg, Tennessee.

State Aid Project No. 152, Anderson County, awarded to the Vincennes Bridge Co., of Vincennes, Indiana.

State Aid Project No. 153, Greene County, awarded to Anderson & Scott, of Harriman, Tennessee.

Mr. J. G. Creveling, State Highway Commissioner, welcomed the large number of bidders present and stated that it was the intention of the State Highway Department to continue to let work in large amounts at intervals of four to six weeks until June 1st, stating that they hope to have approximately $10,000,000 worth of work let by that date.

St. Louis Items

BY A. B. KOENIG

W. J. Gleason Co., Aitkin, Minnesota, have a two-yard dragline and two 1-yard dredges idle that they would like to put to work.

Iver Kriken writes us that he has returned from Alaska. He is spending his winter in Spokane, Washington. He will probably return to Alaska in spring.

Low bids received by the State Highway Department at Jefferson City, Missouri, January 25th, for construction of eight bridges on State Highways were submitted by M. E. Gillioz, Monett, Missouri; The Missouri Bridge & Iron Co., St. Louis; Campbell Bros., Kansas City; List & Weatherly Construction Co., Kansas City; A. P. Munsen, Marion, Iowa; J. G. Nevels, Willow Springs, Missouri; Kess Construction Co., Des Moines, Iowa; and the Carrothers Co., Kansas City, Missouri.

Lowrance Bros., Memphis, Tennessee, were awarded a levee job at Osceola, Arkansas.

Little & Dean of Memphis were awarded contract to build 16 miles of Tennessee road work at Nashville, February 9th.

The C. & G. Construction Co., Hohenwald, Tennessee, are low bidders on State Aid Project No. 116, between Linden, Tennessee, and the Lewis County line, about 13½ miles.

Bill Durkin, in charge of the big steam shovel job of the Walsh Construction Co. on the Big Four Railroad at Sidney, Ohio, made us glad with a visit one day last week. Durkin reports everything going along nicely. He expects to finish this job shortly.

L. C. Kessler is getting ready to resume work early in spring on his bridge contracts in Illinois.

The Parham Construction Co. of East St. Louis were awarded contract for a number of bridges on highways in Tennessee. Total bids $233,891.50.

Edw. M. Rocho Co., 309 Second National Bank Building, Freeport, Illinois, has 70,000 cubic yards of excellent elevating grader work averaging 12,500 cubic yards to the mile in Sections 38A and 39A, Route 2, Ogle and Lee Counties near Dixon, Illinois, to sublet.

Contracts for four sections of the Arkansas Highway between Batesville and Mamoth Springs, Arkansas, were awarded on February 1st to the Western Construction Co., Little Rock; W. I. Davis, Imboden, Arkansas; R. J. Gaster and the Oliver Construction Co. of Little Rock, Arkansas.

J. C. Schwab of Alton is surveying the cinder road north of Carlinville leading into Palmyra, Illinois. Refunds from the State for road work in Macoupin County will be used in improving this road with gravel.

Higgins-Wall-Dyer Co. of St. Louis submitted lowest bid for the construction of the first section of the River Des Peres sewer and storm water channel in western part of St. Louis. Their bid $324,452.20 was $25,547.80 less than the city estimate of $350,000.00.

R. M. (Mique) Quigley, an old St. Louis contractor, now with the Fort Worth Sand & Gravel Co. of Fort Worth, Texas, spent several days here renewing old acquaintances and attending the meeting of the National Crushed Stone Association.

D. O. Johnson of Johnson Bros. Co., Ltd., Brantford, Canada, stopped over here a day on his way home from Oklahoma where he was visiting a cousin. They have enough work in Canada to keep them there for some time. He is not anxious to come back to the states. Our old readers will remember D. O. Johnson as one of the junior members of W. O. Johnson & Sons, Cedar Rapids, Iowa.

Milo R. Hanke of Cincinnati, Ohio, is building a new freight station at Lexington, Kentucky, for the Southern Railway.

T. F. Stroud of Little Red Wagon fame, and wife, Omaha, Nebraska, were here attending the meeting of the National Drainage Congress and the Levee and Drainage Contractors Association.

Geo. W. Horton, engineer of the old Springfield & Memphis, now the Frisco Line, died at Springfield, Missouri, on January 16th, age 77.

Harry A. Henske, St. Louis, submitted lowest bid, $104,756.00, for the construction of bridge over River Des Peres in southwest part of city. The city's estimate was $105,587.00.

L. J. Smith of the Smith & Mitchell Contracting Co., Kansas City, whom we reported seriously ill in last issue, is up and around again. He spent a day with the writer here last week.

Contractors when in want of labor or work for their outfits get in touch with the Koenig Labor Agency, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

Canada

Winnipeg and Vicinity

BY F. X. AMOS

It is expected this year will see Port Arthur, Ontario, move from second place to first place in elevator capacity among parts of the world.

Practical equality for first place is attained with the announcement today of the letting of a contract by the Alliance Terminal Elevator Co., which has Winnipeg interests, to the Barnett, McQueen Co. for a new plant with a capacity of 1,500,000 bushels, which will be fireproof and of most modern construction in every way.

The new elevator will be located near the Bawlf & Stewart elevators which were constructed last season. It is expected other contracts for new elevators or additions to existing plants will be announced shortly.

Mr. D. C. Coleman, Vice-President of Western Lines, Canadian Pacific Railway, has just announced the 1924 program of work, the improvements consisting of additional tracks in many of the terminal yards, extensions to engine houses at several points, construction of eleven new stations, new steel water towers of large capacity and three coaling plants. In addition, there is the usual program of bridge building and replacement, ballasting and rail renewals. Considerable work is contemplated also on the Kettle Valley Railway and on the Eskimo and Nanaimo Line.

Vancouver Notes

BY J. C. MOON

Appropriations totalling $76,000 to be expended during the present year on Shaughnessy Heights at Vancouver, British Columbia, have been endorsed by the Canadian Pacific Railway. The improvements will include the installation of water works, the laying of concrete curbs and the grading of streets.

A sum estimated at $60,000 will be spent this year on improvements in connection with the Great Northern terminal at Vancouver, British Columbia. Included in the plans is the paving in front of the depot and the driveway from Main Street.

The probability of the establishment of a large plant for the development of gypsum properties in British Columbia is suggested in a letter recently received by the British Columbia Products Bureau of the Board of Trade.

Coal bunkers will be erected in Vancouver, British Columbia, this year by the Board of Harbor Commissioners, at a cost of about $165,000, Commissioner R. E. Beattie announced.

Spillers Milling & Associated Industries, Limited, of England, has decided to build a 2,000,000 bushel elevator in Vancouver, British Columbia. It will be built in the near future at a cost of $2,500,000. A site has been obtained on Burrard Inlet. Tenders will be called for by R. H. Gale, who negotiated the deal.

City council of Vancouver instructed City Engineer F. L. Fellowes to start work on a number of street improvements estimated to cost $6,775. In addition to the $200,000 voted this year for street improvements by the ratepayers, it is expected that the provincial government will provide a considerable amount out of its automobile tax.

Work has started on the Canadian Pacific Railroad pier at Vancouver, British Columbia. Contract for the dredging operations has been awarded to the Northwestern Dredging Co.

The construction of a bridge over Cottonwood Canyon is projected by the Pacific Great Eastern Railway. It will be second highest structure of its kind in the world.

TRADE NOTES

The largest order for structural steel that has ever been placed in Nebraska was booked last month by The Omaha Steel Works, and calls for more than 3500 tons of steel to be used in the erection of the new viaduct spanning the Union Stock Yards at South Omaha. Karl Vogel, General Manager of the Omaha Steel Works, engineered the deal.

The new viaduct for which the steel was sold is part of the plan worked out some time ago by Everett Buckingham and other stock yards officials to bring that institution up to a high state of efficiency.

Starting at the west end of the L Street Viaduct the new structure will span the stock yards, straight south to O Street and thence east to the end of the present O Street bridge.

The structure will be 2100 feet long, nearly six blocks, and 74 feet wide all the way.

The molding of the steel is already under way, and according to the terms of the contract deliveries will be started within the next few weeks.

Doherty-Walsh Roller Company Moves Operations

The Doherty-Walsh Roller Company of Baton Rouge, Louisiana, well-known manufacturers of dragline rollers, have advised us that they have recently moved their equipment to a more hilly country. This move has been made necessary because of the extremely bad spell of weather which is the worst that they have experienced during their ten years in the roller business.

They advise us that for the first time in their history their customers have caught them with their "suspenders

broken," and the above-mentioned customers have been obliged to wait in order to have their orders filled. The swamps and roads during the past winter months have been impassable even for their ox teams, which are used exclusively in getting out the roller timber.

The Doherty-Walsh Roller Company has always been able to pride themselves on the fact that their rollers are shipped the day that the contractor's order is received. The contractors have grown so much to count on this prompt shipment, that 90 per cent of them wait until the last moment to place their order. With the new arrangement above-mentioned, they tell us that they expect to take care of their orders as in the past, on the dot.

Rollin Motors Not Connected with the White Company

Reports that the White Company, of Cleveland, leading manufacturers of high-grade motor trucks and busses, had resumed its connection with passenger car production, which it discontinued in 1917, have been definitely set at rest by the official statement that neither the company nor its official or factory personnel has any connection whatsoever with the Rollin Motors Co., or any other passenger car producer.

Current speculation as to whether The White Company had become interested as a manufacturer in the Rollin Motors, a Cleveland newcomer in the passenger car field, is believed to have risen from the fact that Mr. R. H. White, Chairman of the Board of Rollin Motors, was at one time with The White Company, but this has not been true for ten years.

Announcement to Users of Concrete Mixers

The Marsch-Capron Company, Chicago, Illinois, have recently taken a step which should be of interest and importance to users of concrete mixers.

With every Marsch-Capron mixer sold after January 1, 1924, there will be a guarantee certificate giving the scale of minimum allowances for trade-in. Mixers which have had good care, will be given a bigger allowance than the guarantee figure, when traded in.

There is also a fixed scale of prices for complete factory rebuilding—after one year, two years, three years, etc. In this case the guarantee covers the maximum charge for a rebuilding to put the mixer in the same shape as a new machine (so that it carries the same guarantee as a new machine). Mixers which have good care will be rebuilt at lower cost than the amount fixed.

In a nutshell, the new plan means that it is no longer necessary for the user of a mixer to take the risk of getting a machine which will be worth only "junk prices" after a year or two of use. It gives the same assurance of value on a concrete mixer which the prudent buyer looks for when he buys an automobile.

The facts of this new plan are being set forth in a little booklet called, "THE GUARANTEED TRADE-IN VALUE YOU SHOULD GET WITH A WELL-BUILT MIXER."

A copy of this booklet may be had on application to the above company, Chicago, Illinois.

The Gramm-Bernstein Motor Truck Company Reorganization

The property of the Gramm-Bernstein Motor Truck Company, Lima, Ohio, was recently purchased by the reorganization committee of that company, pursuant to the plan of reorganization which was agreed to by interested parties several months ago. The property will be immediately transferred to a new corporation to be known as Gramm-Bernstein Truck Corporation, which will continue business under the present management.

As a part of the reorganization plan, the new company will be furnished a very substantial amount of cash capital in addition to all of the assets of the old company, and it will start in business entirely free of indebtedness. Subject only to formalities of court procedure, the receivership of the old company will be closed, and the new company will take over the property and start its operations on the 1st.

Changes Made in Bear Tractor Company

The sales organization of Bear Tractors Inc. has been expanded, and the following additions to the executive personnel have been made. This is given you for your information and whatever publicity you care to give it.

H. A. Reed has been appointed General Sales Manager and R. C. Brewsaugh Assistant Sales Manager and Advertising Manager. Both will make their headquarters in New York.

Mr. Reed has grown up in the tractor business, having been with the International Harvester Co., Case Threshing Machine Co., Hart-Parr Co. and the Allis-Chalmers Mfg. Co. In these last two associations he accomplished that which put him into the foreground of tractor sales managers.

Mr. Brewsaugh was associated with Mr. Reed throughout that period and is the oldest man in the tractor business who has been in it continuously. Starting with the Gas Traction Co. his career takes up an experience with that concern which marketed the old Big 4, the first gasoline tractor the world ever saw.

Mr. C. A. Bishop has been appointed District Sales Manager of Block No. 6, which comprises Minnesota, the Twin City Territory, Iowa, the Dakotas, Nebraska, Kansas, Western Missouri, Colorado and Wyoming. Mr. Bishop's headquarters will be in Kansas City. He formerly was with the Hart-Parr Co. Mr. Harvey E. Sewell, who also was with Hart-Parr, has been made a District Sales Manager with headquarters in Philadelphia. Mr. Sewell has been very favorably known to the industry in the East for a number of years. He has had phenomenal success.

To manage its export, Bear Tractors Inc. have appointed Mr. Pablo Homs, 44 Whitehall Street, New York. While Mr. Homs is identified in the regular way with the Bear, he will not abandon the use of his own export establishment at the above address. Homs is probably one of the oldest tractor exporters in this country.

Headin' Out

Our ship she lies in the Hoogly Mouth,
But her stem it points to sea.
We're getting steam on the boilers now,
The chains they tug at the restless bow,
The towboat's under our lea.

Up with the anchor outta the mud,
Ease her a bit with the screw.
The wild cats clank as the chain comes in,
Yellow and red and foul as sin,
The mate says, "That'll do."

The tugboat's taken our line aboard,
The engine's turnin' slow,
Ashore them devilish temple bells
Boom and clang like the gates of hell,
They're glad to see us go.

The tug casts off and the engines throb,
The wake's beginnin' to foam,
The sea's beginnin' to turn to blue,
I'd like to sing like the bobstays do,
We're pointin' our nose for home!

Chicago Tribune.

The Excavating Engineer

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BRADLEE VAN BRUNT, Manager and Editor

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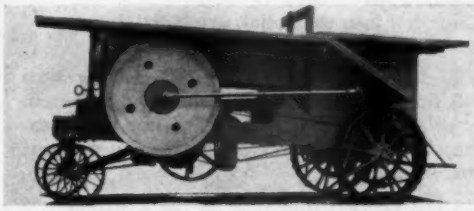

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Mr. Wm. Oberly, Superintendent of dredging on Chesapeake and Delaware Canal Contract of W. H. Gahagan, Inc.

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When W. H. Gahagan, Inc., of Brooklyn, N. Y., contracted to excavate 5,600,000 cubic yards of earth to widen and deepen the Chesapeake and Delaware Canal, they were to meet conditions which they could not have anticipated. The sticking of the clay and sand composition of the bank cut the efficiency of their dredge by 50%, and a hanging of the banks, which fell into the canal, produced damage to construction equipment.

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Bucyrus Class-24 Dragline Equipped with 75-foot Boom, with 25-foot Extension and 5-cubic-yard Bucket

Completed Cut on South End of Magnet Hill

Views of Walsh Construction Company's 720,000-yard Contract on Magnet Hill, Mattoon, Illinois